2025 CUAHSI ANNUAL REPORT

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CUAHSI
allied for water science

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LETTER FROM THE PRESIDENT

Dear CUAHSI community members,

2025 was a year of steady progress and organizational maturation for CUAHSI. We strengthened the infrastructure that supports our community while continuing to expand the programs and partnerships that advance water science.

This report highlights progress across CUAHSI's capabilities, from strengthening the HydroShare Ecosystem, to advancing training and community convenings, to developing innovative cyberinfrastructure and research tools. Within HydroShare, we completed performance and usability improvements, expanded cloud-based workflows, and introduced new efforts to support FAIR-aligned data publishing. We also launched our first Data Publishing Cohort, piloted a HydroCARE Travel Fellowship to deepen engagement around CARE principles, and continued to grow programs that build capacity across career stages.

A major milestone this year was securing a new three-year NSF Cooperative Agreement to sustain and evolve CUAHSI's core programs through 2028. This award reflects confidence in our direction and the value of the work we do together. We also marked the 10th anniversary of the Water Prediction Innovators Summer Institute, highlighting a decade of impact on operational water prediction and the development of the next generation of water scientists.

Behind the scenes, we strengthened our financial and operational systems, completed four annual audits, enhanced reporting transparency, and built internal data dashboards to support more informed planning and oversight. These efforts position CUAHSI to operate with greater resilience in an increasingly complex funding landscape and to remain a steady partner for the water science community.

Our mission remains clear: to empower the water community and advance science through collaboration, infrastructure, and education. Across all of our work, we advance strong, open science and foster durable collaborations that extend beyond any single program or year.

Thank you for your engagement and partnership. CUAHSI's impact is ultimately defined by the strength, growth, and contributions of the community we serve. I look forward to building on that momentum together as we celebrate our 25th anniversary in 2026.

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Regards,

Jordan S Read, PhD

President & Chief Executive Officer

ABOUT CUAHSI

The Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) is dedicated to advancing interdisciplinary water science by providing resources, services, and community support that enable an integrated understanding of water in Earth's systems. Our mission is to empower the water science community through shared infrastructure, collaboration, and capacity-building initiatives. Guided by our Strategic Plan, CUAHSI fulfills this mission through three core capabilities – 1) **HydroShare data infrastructure operations** to sustain and evolve water data publishing and reuse, 2) **training delivery and community convening** to strengthen the water science workforce and launch collaborations, and 3) **cyberinfrastructure and data innovation** to advance transformative water science. CUAHSI's programs and resources are open to all—students, educators, volunteer scientists, outreach coordinators, environmental organizations, and industry professionals alike. While we are a membership-based organization that prioritizes new program needs by soliciting our members, our services are available to the broader water science community. YOU are an essential part of CUAHSI. We invite you to explore our programs and join us in advancing the future of water science. Learn more at www.cuahsi.org.

2026 marks CUAHSI's 25th Anniversary! As CUAHSI approaches this milestone, we celebrate a quarter century of connecting and enabling the water science community through shared infrastructure, data, and expertise. Over the years, CUAHSI has expanded access to data, training, and research infrastructure, helping generations of water scientists confront larger, more integrated research questions. This anniversary honors our past achievements while reaffirming our commitment to supporting a vibrant, inclusive, and forward-looking water science community. We look forward to celebrating this exciting milestone with you!

> **CUAHSI's mission is to empower the water community and advance science through collaboration, infrastructure, and education.**

HYDROSHARE DATA INFRASTRUCTURE OPERATIONS

HYDROSHARE ECOSYSTEM FOR DATA & CLOUD COMPUTING

CUAHSI's **HydroShare Ecosystem** provides free, open-source software for managing, archiving, sharing, discovering, publishing, and analyzing all types of water data in alignment with FAIR (Findable, Accessible, Interoperable, and Reproducible) data principles.

The HydroShare Ecosystem includes HydroShare, CUAHSI's digital repository for water data, along with cloud-based environments that connect data directly to analysis tools and reproducible workflows. Together, these services support the full research lifecycle, enabling transparent, reproducible analysis and collaboration.

HYDROSHARE

HydroShare is CUAHSI's primary water data repository and is designed to support open data sharing and collaboration. HydroShare enables users to store and manage a wide variety of data and model formats and make them available in a citable, shareable, and discoverable manner. HydroShare-linked web applications further extend these capabilities by connecting users with computing and analysis tools to complement their data.

HydroShare provides tools for uploading data, managing sharing permissions, receiving feedback, as well as the option to permanently publish research products with a citable Digital Object Identifier (DOI) to meet funder and journal requirements. HydroShare facilitates collaboration by enabling users to join groups and share data, and enables users to easily find data and models made available by other users. Flexible privacy controls enable researchers to determine when and how their data become publicly accessible, including delaying release until after publication or an embargo.

In 2025, HydroShare continued to run reliably, with minimal downtime and improved stability following its move to the cloud in 2024. Regular software updates, system monitoring, and performance tuning supported ongoing improvements in reliability and scalability. Security enhancements and performance optimizations were completed to uphold cybersecurity and compliance standards. All HydroShare system releases can be viewed on GitHub.

In addition, several key initiatives were completed to continue to improve the HydroShare system:

- HydroShare's DOI registration was transitioned from Crossref to DataCite, which better aligns with the research products published in HydroShare, better integrates with NSF-PAR reporting, and improves HydroShare data discovery and integration into global data-sharing networks.
- CUAHSI collaborated with DataONE (www.dataone.org) to conduct a FAIR assessment of public and published resources, which will serve as a baseline for metadata quality and future improvements.
- Performance improvements were made to the My Resources, Groups, and Communities landing pages to significantly reduce load times.
- Discover and Resource landing pages were redesigned to improve usability and streamline maintenance and operations. These changes will be deployed in 2026.

123 First-Time Publishing Authors

1,818 Hydroshare Resources Created

283 Published Resources

193 Publishing Authors

444 Help Desk Requests Resolved by Community Support Staff

TOOLS FOR CLOUD-CENTRIC DATA ANALYSIS

In addition to the data repository, the HydroShare Ecosystem includes cloud-based computing environments that support open science. These systems provide free and equitable access to computing resources without needing local hardware or software licences, and enable scientific research and data reuse.

CUAHSI currently provides two primary cloud computing platforms: **Community JupyterHub**, a flexible environment that supports the Python and R programming languages, and **MATLAB Online**, an enterprise software system created and maintained by Mathworks.

Community JupyterHub

CUAHSI's Community JupyterHub is a free, general-purpose, cloud computing service that enables users to execute scientific code as well as explore, modify, and interact with data inside a remote execution environment using Python and R programming languages. It is integrated with the HydroShare Ecosystem, making it easy to access community datasets, collaborate with others, and share reproducible research workflows with others.

Designed to lower the technical barriers that impede scientific research, our JupyterHub environments are pre-configured with commonly used scientific libraries and models. Personalized data storage enables users to save both completed and ongoing work within their environment so they can return to it later, making it ideal for a variety of research and educational uses. CUAHSI JupyterHub environments are also configured with tools and libraries for working with data stored in HydroShare.

MATLAB Online

CUAHSI continues to partner with MathWorks to offer MATLAB Online, a cloud-based computational modeling platform using MATLAB software. This service supports hands-on quantitative exploration for both research and education without the need for local MATLAB installations.

MATLAB Online is integrated with the HydroShare repository, making it easy to access shared data and code, analyze results, and reproduce published workflows. This service provides a convenient and freely accessible mechanism for data discovery, collaboration, and reproducibility, and is relevant to a wide range of water resources professionals.

JupyterEdu: Support for Educational Cloud Computing

JupyterEdu is part of CUAHSI's ongoing effort to provide access to cloud computing capabilities specifically designed for education, training, and workforce development. This service provides event-specific cloud computing infrastructure for educational activities such as workshops, classroom exercises, and professional development events. Using the same underlying cyberinfrastructure as the Community JupyterHub, CUAHSI can provide pre-configured computing environments for focused content that require event-specific tools, software, and custom hardware configurations. CUAHSI has provided these capabilities for events ranging from educational seminars consisting of more than 100 participants, specialized computing hardware for machine learning research, terabyte-scale data storage, and regional hydrologic modeling. We are always excited to explore new ways to support additional events.

Interested in using JupyterEdu for a class or workshop? Contact help@cuahsi.org to learn more about how CUAHSI can support your event.

Web Applications

CUAHSI offers hosting solutions for community-developed web applications written in the Python and R programming languages to alleviate the hosting responsibilities for scientific and educationally-focused software. This enables researchers to focus on science rather than cyberinfrastructure. CUAHSI currently hosts 20 web applications, including several popular web applications that focus on the dissemination of science visualization (RiverColor), data discovery (Macrosheds), and science education tools (WaterBalance). CUAHSI continues its collaboration around community modeling by providing a service for extracting static model input datasets for regional studies across the continental United States (CONUS), via the Data Subsetter. This service provides access to critical hydrologic modeling datasets around closely aligned community research efforts. By leveraging a combination of modern cyberinfrastructure techniques and state-of-the-science modeling tools, model users have access to multiple versions of National Water Model and ParFlow-CONUS domain data that would otherwise require extensive computational resources and expertise to generate. This web application has supported scientific research studies investigating streamflow predictions using multi-model and multi-precipitation forcings (see Seo et al., 2021), and continental hydrologic intercomparisons (see Tijerina-Kreuzer et al., 2021).

EXPANDING AND ENHANCING OUR WATER DATA SERVICES

A core component of the HydroShare Ecosystem is our human infrastructure - our staff who provide user support and training. CUAHSI continues to grow and strengthen our data tools and services by providing training, engagement opportunities, and pilot programs to expand our reach and grow the HydroShare user community. In 2025, staff led several training and workshop opportunities geared towards expanding awareness of and providing training on the use of CUAHSI's data tools and services, and piloted two unique programs:

01 CUAHSI piloted the **HydroCARE Travel Fellowship** which provided travel support and honoraria for two Fellows to participate in activities that helped deepen CUAHSI's understanding of community needs related to data governance and CARE (Collective Benefit, Authority to Control, Responsibility, and Ethics) principles. This initiative connected CUAHSI staff with new audiences and created opportunities for ongoing dialogue with Tribal communities. Feedback collected from the Fellows will inform future engagement efforts and system improvements.

02 CUAHSI also piloted its first **Data Publishing Cohort** which provided structured guidance and consultation to help researchers prepare high-quality, FAIR data for publication. Over three weeks, participants attended five webinar sessions covering topics from metadata fundamentals to file organization to leveraging cloud computing resources on HydroShare. Participants could also schedule a thirty-minute consulting session with a CUAHSI staff member to receive specialized assistance with their data publication. Building on the success of this pilot, we plan to offer additional Data Publishing Cohorts in 2026.
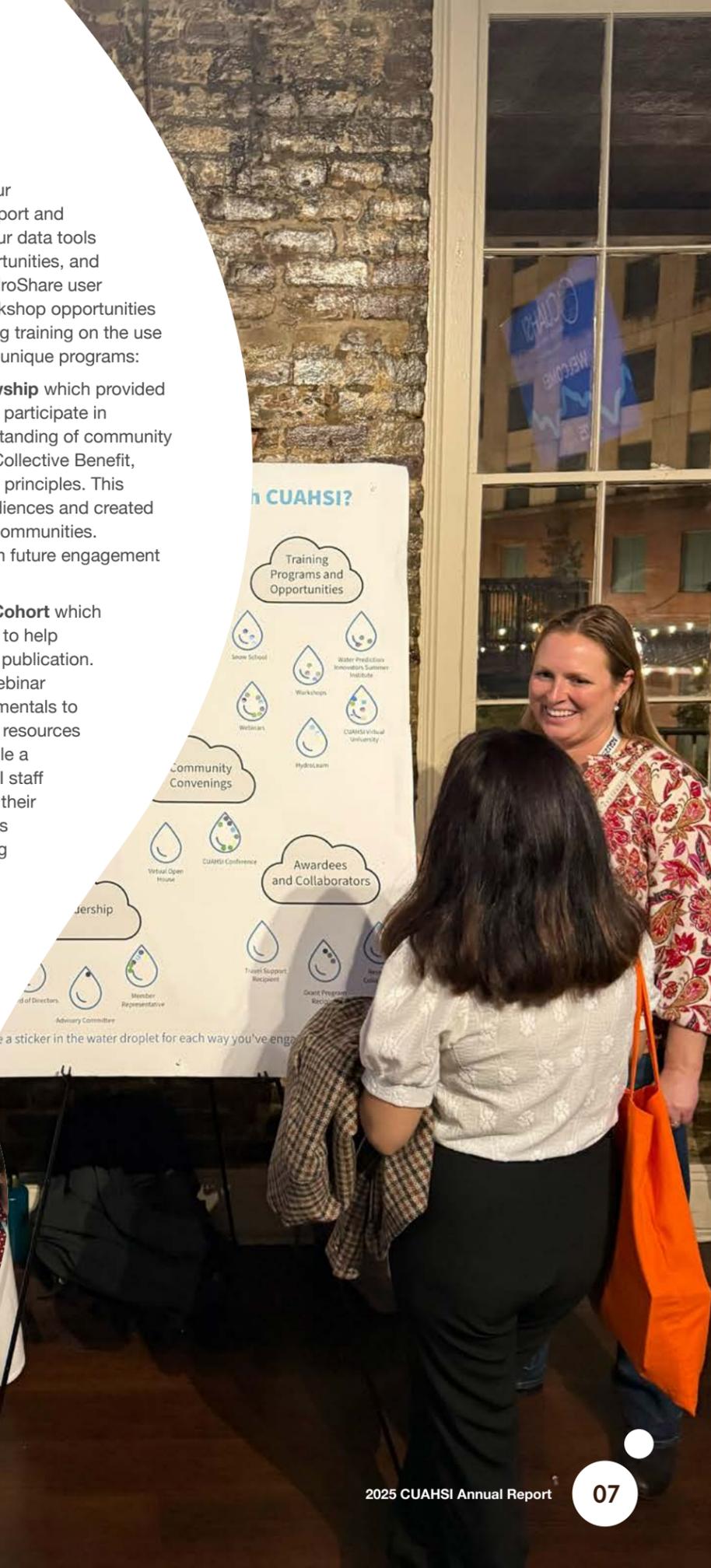
TRAINING DELIVERY & COMMUNITY CONVENING

CUAHSI's training and education programs bring researchers and professionals together to strengthen skills, share knowledge, and launch new collaborative science. Through hands-on workshops, fellowships, and virtual learning experiences, we provide learning opportunities for researchers and professionals at every career stage, which strengthen national STEM capacity, advance hydrologic data skills and research readiness, and foster multidisciplinary perspectives on water science.

These programs increase access to specialized instrumentation, field methodologies, and data services while expanding awareness and use of CUAHSI's HydroShare Ecosystem of data tools and services. By offering both in-person and virtual programming, we can reach geographically dispersed audiences. Looking ahead, we continue to curate and streamline our training and education portfolio to deliver effective, outcome-driven, and repeatable programming that is more tightly integrated with our data services.

CUAHSI's vision is a thriving water community – enabled by shared resources – developing an integrated understanding of water, earth, ecosystems, and society to meet human and environmental needs that is strengthened by interdisciplinary collaboration and the acceptance of diverse ideas and perspectives in the hydrologic sciences. A Code of Conduct which describes community standards for participation is fully implemented for all CUAHSI services and all participants are expected to adhere to the code.

CUAHSI VIRTUAL UNIVERSITY

The CUAHSI Virtual University (CVU) is a unique interuniversity education program that enables students to participate in online hydrology course modules taught by faculty from leading institutions and specialized research areas. The unique format enables students to earn course credit for participating in the CVU through their home university.

CVU:

- Enhances the depth and breadth of graduate course offerings for participating universities.
- Enables graduate students to access expertise and topics not offered at their home university.
- Facilitates networking among the hydrologic community.

In 2025, 74 students across 9 institutions participated in the CVU. The course modules included:

Geospatial and Hydrologic Data Catalogs and Processing Using Google Earth Engine
Instructor: **Samapriya Roy,** Desert Research Institute

Infiltration Process and its Modeling
Instructor: **Xixi Wang,** Old Dominion University

Standardized Evapotranspiration Modeling for Agricultural Applications
Instructor: **Meetpal Kukal,** University of Idaho

Hydrologic Data Visualization
Instructor: **Sam Zipper,** University of Kansas

Uncertainty Quantification, Sensitivity Analyses, and Inverse Methods in Hydrology
Instructor: **Zach Perzan,** University of Nevada-Las Vegas

Snow Hydrology: Focus on Modeling
Instructor: **Jessica Lundquist,** University of Washington

Ecohydrology of Groundwater Dependent Ecosystems
Instructor: **Steven Loheide,** University of Wisconsin-Madison

Applying GIS for Terrain & Watershed Analysis in Hydrology
Instructor: **David Tarboton,** Utah State University

Sustainable Human-Water systems
Instructor: **Landon Marston,** Virginia Polytechnic Institute and State University

HYDROLEARN

HydroLearn is an educational project initially funded by the National Science Foundation (NSF) that provides free, customizable active-learning resources for hydrology and water resources engineering faculty, students, and professionals. CUAHSI has been collaborating on a series of projects funded by the Cooperative Institute for Research to Operations in Hydrology (CIROH), to develop learning modules that align with CIROH's research themes and support the advancement of water prediction.

As part of this effort, in January 2025, a virtual workshop brought together HydroLearn Fellows - faculty, students, and postdocs - to receive training and coaching from hydrologists and education experts, and create high-quality learning modules for use in both academic courses and professional development for operational hydrologists. Fellows designed modules centered on real-world problems of practice, aiming to bridge the gap between theoretical knowledge and applied water prediction research. HydroLearn continues to grow with new modules and contributors. Explore the platform and see how it is transforming hydrology education at HydroLearn.org.
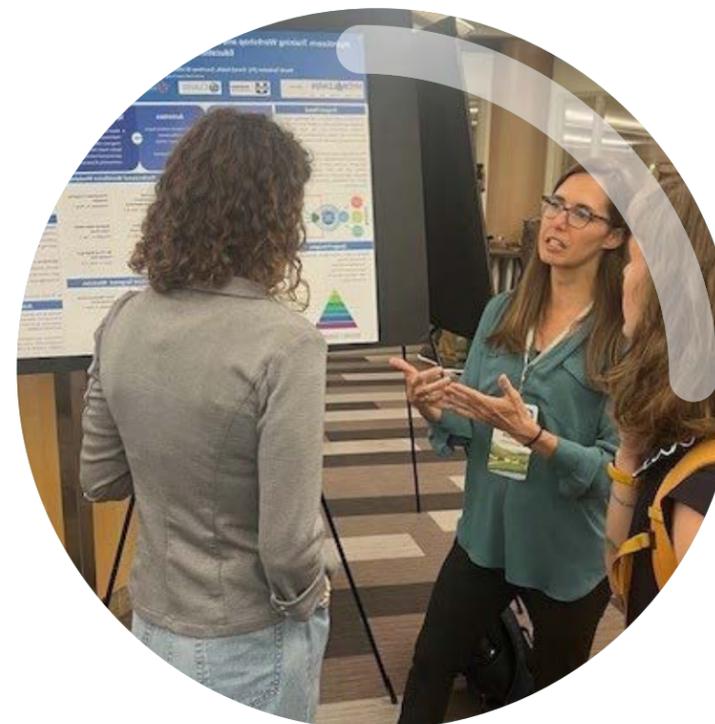
The completed course modules from the January 2025 hackathon are listed below, and three additional modules are still undergoing revision and review.

National Oceanic Atmospheric Administration (NOAA) **National Water Model - Flood Risk Impact Mapping**
Fellows: **Hesham Elhaddad,** Western Michigan University
            Duc Tran, Virginia Polytechnic Institute and State University

Model Structure Uncertainty with MARRMoT
Fellows: **Wouter Knoben,** University of Calgary
            Diana Spieler, University of Calgary

Using Flood Inundation Mapping and Social Considerations to Make Decisions
Fellows: **Ann Nyambega,** University of Hawaii
            Lakelyn Taylor, University of Vermont

Introduction to Seasonal Snow Observations, Modeling, and Analysis
Fellows: **Irene Garousi-Nejad,** CUAHSI
            Ryan Johnson, The University of Utah

Precipitation Frequency and Storm Analysis in Operational Hydrology
Fellows: **Mohamed Abdelkader,** University of Iowa
            Yinphan Tsang, University of Hawaii

Flood Inundation Mapping and High Risk Facility Identification
Fellows: **Saide Zand,** University of Alabama
            Sushree Swagatika, University of California - San Diego

CYBERSEMINARS

[CUAHSI Cyberseminars](#) feature presentations, panels, and virtual events with experts on new or timely topics of interest. The program enables researchers to share their work and contribute to an archive of over 200 lectures available to the public. Presentations from CUAHSI's 2025 Cyberseminar Series are available to view on the [CUAHSI YouTube Channel](#).

2025 Cyberseminars:

Post-Field Season Data Management

This series focused on data preparedness after field work, including exploratory data analysis, and preparation for data publishing.

The series were convened by Tyler Butts, University of Wisconsin-Madison, Lindsay Platt, CUAHSI, Abner Bogan, CUAHSI and included:

- Proactive Data Management for Post-Field Season Data Success
- Post-Field Season Data Practices for Research Success

Water Data Forum

This series engaged a broad professional audience on timely and important challenges faced in the water data field. Topics ranged from specific industry technologies to general research techniques, exploring the full breadth of the world of water data.

The series were convened by the Cleveland Water Alliance, the Water Environment Federation, and CUAHSI, with CUAHSI leading coordination for one webinar in the series entitled:

- Data Driven Approaches to Understanding Emerging Contaminants

Changes Coming to United States Geological Survey (USGS) Water Data APIs

This webinar reviewed changes to the USGS Water Services APIs and impacts to research workflows.

The webinar was convened by Cee Nell, Elise Hinman, and Mike Mahoney, members of the USGS Water Resources Mission Area.

USGS National Water Availability Assessment

This series walked audience members through the key findings of the National Water Availability Assessment, ways to access the data through the Data Companion, and how data science and visualizations are used to communicate the assessment findings to various audiences.

The series included presentations by Althea A. Archer, Science Communicator, USGS, Shirley Leung, Product Owner, USGS, Anthony Martinez, Data Scientist, USGS, Jennifer Rapp, Branch Chief, USGS, Megan Shoda, Hydrologist, USGS, Edward Stets, Research Ecologist, USGS and included:

- National Water Availability Assessment: Understanding the Science
- National Water Availability Assessment: Communicating the Science with Data Science and Visualizations
- National Water Availability Assessment: Leveraging the Science with the Data Companion

Navigating (beyond) Academic Waters

This series was created to help early career hydrologists identify skill sets for non-academic careers, locate and secure project funding, and explore new data science tools for hydrology.

The series were convened by the [AGU Hydrology Section Student Subcommittee](#) and included:

- Navigating Academic Waters: Reframing research language for impactful and relevant Broader Impact statements
- Navigating Academic Waters: Highlighting Skill Sets for Careers Outside of Academia
- Navigating Academic Waters: Expanding Funding Landscape: Non-Federal Funding Opportunities
- Navigating Academic Waters: Leveraging AI and Data Science in Hydrology

409
Participants in CUAHSI Hosted Events

333
Students Spent
381 HOURS
Learning in Cyberseminars

TRAINING

In-Person Workshops

CUAHSI facilitates [workshops](#) and short courses that provide interdisciplinary perspectives on specific technologies or topics that may not be available through any single institution. Along with building new skills, CUAHSI workshops create opportunities for community collaboration and relationship building between participants and instructors from different institutions.

2025 Workshops

Snow Measurement Field School

In partnership with SINTER: Snow International and NASA, CUAHSI hosted the 7th Snow Measurement Field School that took place from January 6-10, 2025 in Mammoth Lakes, California. Participants gained fundamental training in methods for high-quality fieldwork taking snow measurements, and the workshop provided greater context to remote sensing approaches.

A total of 92 applications were received, and 22 people participated including a mix of undergraduate students, graduate students, and those employed in non-profit, private, and public sectors. The instructors were Kate Hale, The University of British Columbia, Alex Langlois, Université de Sherbrooke, Joachim Meyer, Boise State University, Megan Mason, University of California-Berkeley, and McKenzie Skiles, The University of Utah.

Stakeholder-Informed Spatial Modeling for Hydrologic Sciences

The Stakeholder-Informed Spatial Modeling for Hydrologic Sciences workshop was held from August 18–19 in Nahant, Massachusetts. The event was organized in collaboration with and support from instructors from Indiana University–Bloomington and Northeastern University. The workshop was designed to help early-career researchers integrate spatial and hydrologic sciences for modeling applications and engage stakeholders to design model outcomes and communication strategies that are meaningful to model users. A total of 68 people applied to participate in the workshop, and 15 were selected to attend, representing 13 unique institutions.

Data Training & Skill Building

To advance water science, CUAHSI provides training and skill-building opportunities that strengthen data science and data management skills across the water science community. These efforts focus on helping researchers adopt FAIR-aligned practices, use cloud-based tools effectively, and publish high-quality, reusable data products.

In 2025, CUAHSI staff delivered hands-on workshops on HydroShare and related cloud computing tools at several conferences, including the Earth Science Information Partners (ESIP) Winter Meeting, National Monitoring Conference, Universities Council on Water Resources (UCOWR) Annual Meeting, and the National Diversity in STEM (NDiSTEM) Conference. These sessions expanded awareness of CUAHSI's Water Data Services and provided practical guidance on data publishing, reproducible workflows, and collaborative data use. Abner Bogan and Lindsay Platt published the first hydrology-focused notebook in the Environmental Data Science (EDS) [E-Book](#), demonstrating the R package **targets** as an accessible and powerful approach for building reproducible workflows using multi-agency water data. Together, these activities supported skill development across career stages and reinforced best practices for open, reproducible water science.

Check out our [Data Management Plan At-A-Glance Guide](#) to learn the basics of getting started with Data Management Plans!

Water Prediction Innovators Summer Institute

2025 was a milestone year for the Water Prediction Innovators Summer Institute (WPI-SI) marking the program's 10th anniversary! A collaboration between CUAHSI and The University of Alabama, the WPI-SI is a seven-week hands-on program that trains graduate students in tools and research to advance water prediction. Since 2015, the program has brought together over 250 graduate student fellows from nearly 100 universities to collaborate on cutting-edge research in water prediction and flood forecasting. Beyond the research, the WPI-SI also builds lasting professional networks that continue to drive innovation in water science.

As part of the 10th anniversary celebration, The University of Alabama and Alabama Water Institute released a retrospective video highlighting the Summer Institute's decade of impact: 10 Years, 1 Mission: How Elite Water Scientists Built the National Water Model

(Created by: Kim Byers, Riley Baird, Ryan Ruiz, and Brock Parker from the Alabama Water Institute Communications Team).

From June 9–July 25, 2025, 22 graduate students from 17 unique institutions traveled to The University of Alabama and participated in research under the following four themes:

Theme: Operational Flood Inundation Mapping

Theme Leaders: Sagy Cohen, The University of Alabama and **Yinphan Tsang,** University of Hawai'i-Mānoa

Project: A Comparative Analysis of Multi-Method Flood Inundation Mapping: Quantifying Fidelity–Accuracy Tradeoffs and Bridging Gaps via Hybrid Deep Learning

Faezeh Maghsoodifar, The University of Alabama, **Mohamed Mowafy,** University of Cincinnati, **Md Shadman Sakib,** Virginia Polytechnic Institute and State University, **Haotian Wang,** University of Connecticut

Theme: LSTM for NextGen

Theme Leaders: Jonathan Frame, The University of Alabama and **Amobichukwu Amanambu,** The University of Alabama

Project: Scoring Rule-Based LSTM Models for Flow Forecasting in the NextGen Framework

Mohamad Ali Farmani, University of Arizona, **Arman Oliazadeh,** University of Georgia, **Habtamu Tamiru,** The University of Alabama, **Fatemeh Yavari,** The City University of New York

Theme: Pluvial Urban Flooding

Theme Leaders: Marouane Temimi, Stevens Institute of Technology and **Jonathan Frame,** The University of Alabama with additional technical support provided by **Mohamad Abdelkader,** University of Iowa

Project: Towards Representing Pluvial Flooding within NOAA's NextGen Modeling Framework

Yogesh Bhattarai, Howard University, **Supath Dhital,** The University of Alabama, and **Samrin Sauda,** Pennsylvania State University

Project: Demonstrating the Feasibility of DL-Based Pluvial Flood Mapping in Urban Settings

Mostafa Saberian, Clemson University, **Sadra Seyvani,** The University of Alabama, **Adam Smith,** Rutgers University, **Keivan Tavakoli,** University of Texas-Austin

Theme: Visualization of Urban Road Flooding

Theme Leaders: David Maidment, University of Texas-Austin and **Kelsey R. McDonough,** The Water Institute

Project: Towards a Flood Navigation and Safety Decision Support Tool: A Pilot for Emergency Responders in Travis County, Texas

Kayode Adebayo, South Dakota State University, **Nana Oye Djan,** Carnegie Mellon University, **Ali Farshid,** Utah State University, **Saide Zand,** The University of Alabama

Project: Estimating Flood Inundation Using a Densified Stream Network in Travis County, TX

Victor Oladoja, University of Connecticut, **Alex Simpson,** University of Oregon, **Megan Vardaman,** University of New Hampshire

Community Events

CUAHSI hosted its first ever **Virtual Open House** on October 22nd, which created a venue to share updates and listen to thoughts and needs from the community. To kick-off the event, Chief Executive Officer Jordan Read shared plans for CUAHSI's work under a new three-year (2026-2028) NSF award which supports our core programs and services. If you missed the event, you can watch Jordan's opening presentation here. The Open House featured several topic-focused breakout discussions that provided valuable input that we'll draw on as we plan for the year ahead. We plan to host Virtual Open House events twice per year to maintain an open dialogue and share ongoing progress. Stay tuned for details about the next Open House in the spring of 2026.

CUAHSI held a community gathering during the annual American Geophysical Union Meeting on the evening of December 17 in New Orleans, LA, bringing 164 attendees together to learn more about CUAHSI programming and to provide their input on future efforts. The event was lively and welcoming, with a diverse mix of students, faculty, long-time and new community members, board members, staff, and program alumni. It provided a relaxed and enjoyable way to unwind after a busy conference day, offering opportunities to meet new colleagues, reconnect with old friends, learn more about CUAHSI, and share personal experiences with CUAHSI's programs and services.

22 Student Fellows

from 17 Unique Institutions

Participated in the 10th Summer Institute

Grants & Fellowships

CUAHSI's grants and fellowships support the next generation of water scientists in their research and education endeavors. While funding for CUAHSI's grants and fellowship programs came to an end in 2025, CUAHSI leadership will explore alternate ways to offer future fellowship experiences to continue to support skill and capacity building in the water sciences.

Pathfinder Graduate Student Fellowship

The Pathfinder Fellowship program provides travel funds to graduate students in hydrology and related sciences to make an extended trip to enhance their research by adding a field site to conduct comparative research, collaborating with a research group, or working with researchers on adding an interdisciplinary dimension to a project.

The awardees include:

Reservoir Modeling and Associated Uncertainty in the Western U.S.
- **Surabhi Upadhyay,** Colorado School of Mines

Centralizing Community Water Systems in Costa Rica
- **Gabriela T. Sancho-Juarez,** Utah State University

Tracing the Relative Contributions of Contemporary and Ancient Mercury to Arctic Aquatic Food Webs
- **Taylor Evinger,** University of California-Davis

Instrumentation Discovery Travel Grant

CUAHSI's Instrumentation Discovery Travel Grant program enables scientists to learn the details of hydrologic instrument installation, operation, maintenance, and data processing by visiting experts or scheduling reverse site visits.

The awardees include:

Soil, Plant, and Weather Sensing for Teaching and Research
- **Abiodun Emmanuel Abioye,** Reedley College

Integration of Multistatic Radars into Ground-Based Sensor Network for Precipitation Estimation
- **Humberto Vergara,** University of Iowa

Distributed Temperature Sensing for Soil Moisture Estimation at a Wetland Restoration
- **Lyn Watts,** University of Massachusetts

Proximal and Remote Sensing Technologies for Monitoring Water Dynamics in the Vadose Zone
- **Xi Zhang,** University of Tennessee-Knoxville

HydroInformatics Innovation Fellowship

The Hydroinformatics Innovation Fellowship supports projects that result in a hydroinformatics product that can be broadly shared and used. In 2025 the fellowship included a "Data Booster track" focused on increasing general "FAIRness" of hydrologic data, including an emphasis on funding work that could increase the likelihood for data reuse.

The awardees include:

Continental-Scale River Streamflow Database for Benchmarking, Calibrating, & Training Physical & AI Models
- **Adnan Dehghaninahrkhalaji,** Rice University

Framework for Evaluating Groundwater & Storm and Sanitary Sewers Interactions: Standalone Models vs. Coupled Model
- **Omowumi Erukubami,** University of Delaware

A Century of California Water Data Restored by Machine Learning
- **Annette Hilton,** University of California-Santa Barbara

HydroViz: Building Capacity for Environmental Data Literacy and Watershed Synthesis; An Open-Source Hydroinformatics Platform for Undergraduate Education
- **Keira Johnson,** Oregon State University

Boosting Synthesis of Local Soil Moisture Datasets for an AI-Ready Global Database to Enhance Assessment of Soil Water Dynamics
- **Caitlin Mayernik,** Oregon State University

Scalable, Adaptive, Risk-Informed Hydrological Network Design: Developing an Open-Source Toolkit for the Hydrologic Community
- **Jeil Oh,** University of Texas

Rescuing Water Infrastructure Operational Knowledge via AI-Driven Data Integration
- **Seongeun Park,** Carnegie Mellon University

A Community Dataset & Deep Learning Toolkit for Remotely Sensed Historical Flood Exposure in the U.S. Midwest
- **Alex Saunders,** University of Arizona

$47,592 Awarded

378 Program Applications Received

Convening the Community for Real-World Impact

CUAHSI convenes the community to foster collaboration and achieve greater science impacts. By facilitating collaborative opportunities, we help turn research into outcomes that advance science and benefit society.

CUAHSI leads the Coordinating Hub for the Critical Zone Collaborative Network (CZNet) under a five-year cooperative agreement from NSF. Designed to foster discovery and data sharing among multiple Thematic Clusters, the Hub supports virtual and in-person events that bring together researchers from diverse fields. These events help identify shared challenges, encourage interdisciplinary perspectives, and build a cohesive learning environment for the study of Earth's "critical zone," the near-surface environment where rock, soil, water, and life interact. In 2026, the CZNet project will come to an end. Long-term data archiving and access will be integrated into our community-supported repositories, including HydroShare and EarthChem (operated by the Lamont-Doherty Earth Observatory). This will ensure CZ Net data remain accessible for future use.

Perceptual Models: Defining Hydrologic Landscapes Across North America

Understanding how hydrologic processes vary across large geographic domains is critical for improving water prediction and resource management. The Perceptual Models project (funded via NA22NWS4320003) convened scientists from across North America to define a manageable set of hydrologic landscape regions that share dominant process characteristics while remaining distinct from surrounding areas.

CUAHSI played a central role in organizing this effort, co-leading five regional workshops that brought together field scientists, modelers, and interdisciplinary researchers. These workshops enabled a structured community synthesis that integrated large-scale datasets with decades of field-based expertise. The outcomes include a continental map of hydrologic landscapes, three synthesis manuscripts (in prep), detailed scientific illustrations for five multi-region "provinces" (see below), and 35 perceptual models describing dominant processes within each landscape.

Made possible through broad community participation and leadership, this work reflects the strength of CUAHSI's convening model: bringing interdisciplinary experts together to translate distributed knowledge into shared scientific understanding that advances hydrologic understanding and informs related fields.

Central Domain

Eastern Domain

Western Domain
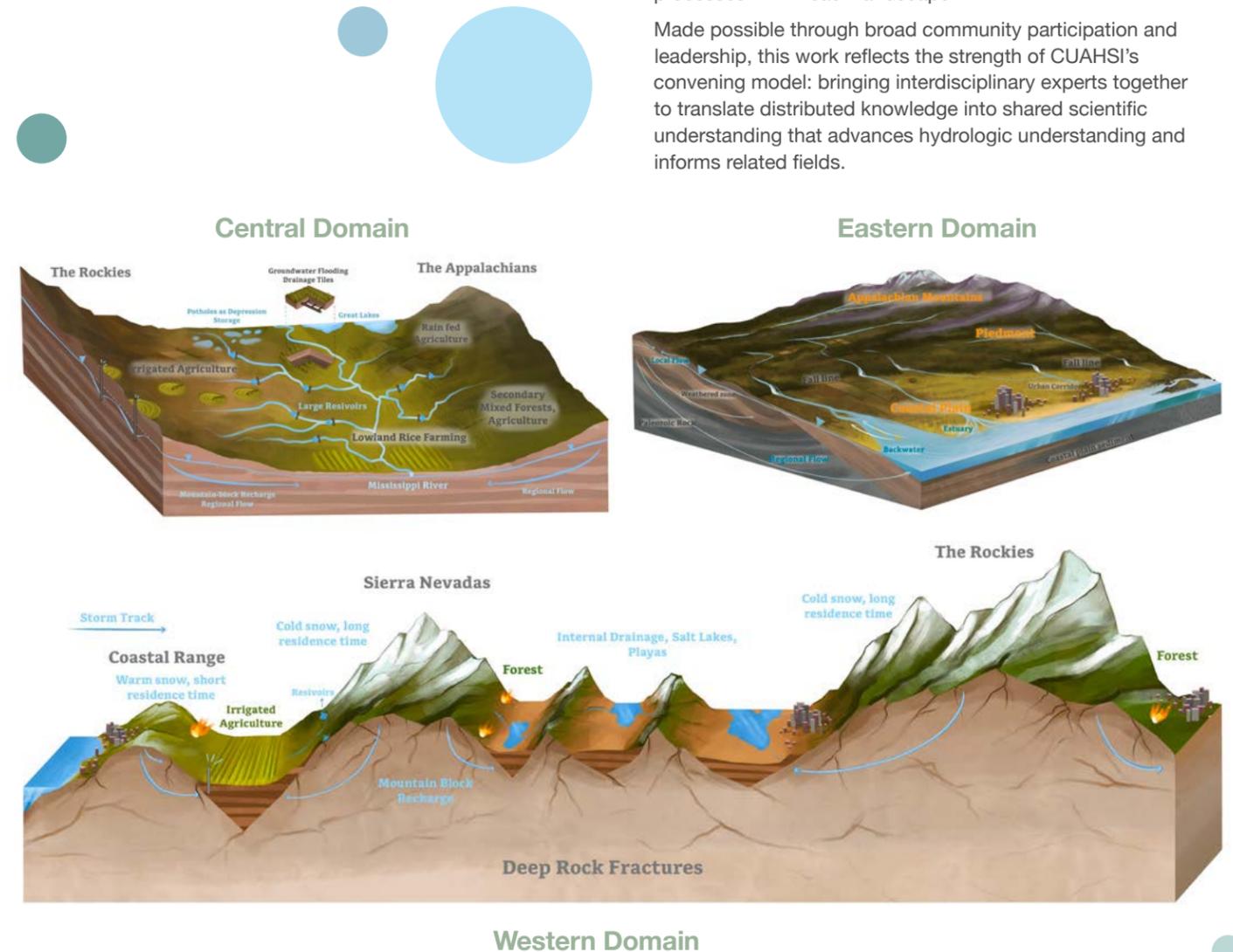
CYBERINFRASTRUCTURE & DATA INNOVATION

CUAHSI advances cyberinfrastructure and data innovation to address common data management challenges in the water science community, many related to the way that water data and models are accessed, used, and understood. These efforts focus on reducing technical barriers, supporting modern computational workflows, and enabling new approaches to data-driven research.

SUPPORTING MID-SCALE AND LARGE DATA

Recent cyberinfrastructure efforts have focused on expanding support for mid-scale and large datasets building on the modernization of HydroShare and its transition to the commercial cloud. CUAHSI has advanced methods for more efficient access to large data, including approaches that allow users to work with portions of datasets without requiring full downloads. Co-locating data and computing resources supports modern, cloud-native workflows and enables more efficient analysis.

FLEXIBLE DATA STORAGE AND STEWARDSHIP

Improvements to data storage flexibility will allow HydroShare to better scale based on usage and community needs. Direct cloud storage mounts and "bring your own bucket" approaches enable organizations to connect their own data to HydroShare while maintaining ownership and stewardship, supporting collaboration within institutional data governance frameworks.

ADVANCING REPRODUCIBLE WORKFLOWS

CUAHSI continues to advance and support reproducible computational workflows within the HydroShare Ecosystem by building on capabilities established through its recent modernization. Ongoing efforts focus on developing community resources including scientific code tutorials, best-practice guides, and educational examples to help researchers create, share, and reuse reproducible workflows.

In 2026, CUAHSI will continue to build the **Water Science Quick-Start Data Sandbox** to provide browser-based access to course-specific code (Python, R, and MATLAB) and code examples to enable students to execute computational analysis in pre-configured, course specific, cloud environments that don't necessitate local setups or installations. Designed to support up to 30 concurrent users, CUAHSI's Sandbox will include dedicated staff support for instructors and offers a practical pathway for introducing cloud-based workflows in educational settings. Stay tuned to learn more!

APPLYING DATA INNOVATION INTERNALLY

In addition to community-facing tools and services, CUAHSI applies cyberinfrastructure and data science best practices internally to support efficient, data-informed operations. In 2025, the data science team strengthened workflows for project management, budgeting, and planning, including the launch of an interactive dashboard to analyze engagement across programs and services.

HOW TO WORK WITH CUAHSI

CUAHSI offers several ways to collaborate which can be scaled to match the level of effort and support needed. Options include letters of collaboration, co-developing collaborative proposals, and incorporating our services into external proposals through a fee-for-service model. If you're interested in working with us on a project or initiative, reach out to connect@cuahsi.org to further discuss

CYBERINFRASTRUCTURE AND DATA INNOVATION RESEARCH HIGHLIGHTS

Much of CUAHSI's research and scientific experimentation work falls under our CyberInfrastructure and Data Innovation capability. Our team collaborates on community research proposals to establish innovative approaches to addressing modern water data and modeling challenges, with an emphasis on solutions that can be translated into scalable, sustainable, community-facing services. These efforts begin as research projects and, if successful, are transitioned into operational tools and resources made available to the entire CUAHSI community. Highlights from collaborative projects led by our research team are included below.

In 2025, CUAHSI and partners at the Global Resilience Institute at Northeastern University released the first version of **FloodSavvy**, a web application for accessing near-realtime hydrology data with an emphasis on community resilience. This multi-year project explored how predictions from NOAA's National Water Model can be combined with Flood Inundation Mapping capabilities to support local-level resilience planning. The application was made possible through engagement with six stakeholder communities across Vermont and Missouri, who helped shape the project outcomes to translate advanced flood forecast data into actionable information for local decision-makers, including those without hydrologic training. Learn more about the project at: www.cuahsi.org/community/news/floodsavvy

Building infrastructure to support the reuse of water science models and analyses requires interdisciplinary collaboration around, and adoption of, best practices and standards. One substantial challenge is how to best describe our research software and codes such that they are discoverable and usable by future researchers. To address this, CUAHSI developed a meta-driven evaluation framework to quantify the extent to which published research software meets FAIR for Research Software (FAIR4RS) principles. The end goal is to improve
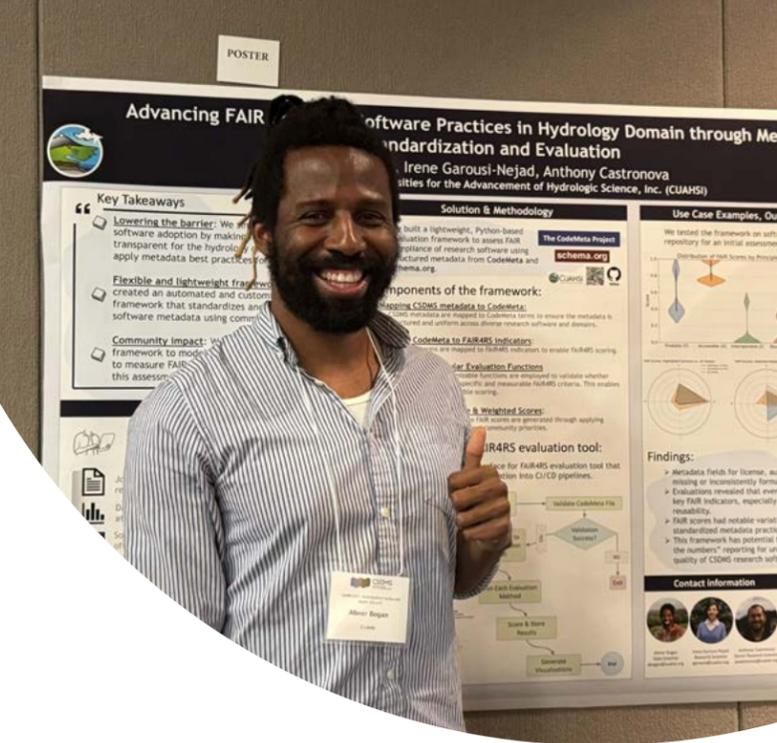
long-term software reuse by providing authors with actionable guidance on how to better meet FAIR4RS guidelines and improve their software metadata. In collaboration with Arizona State University and the Community Surface Dynamics Modeling System (CSDMS), CUAHSI has completed a preliminary analysis of all research models within the HydroShare and CSDMS repositories. Our approach leverages a descriptive and extensible metadata standard (Schema.org and Codemeta) that supports translation of metadata across repositories and scientific domains. FAIR scoring serves as a useful and engaging tool for individuals and groups to improve the reusability of their software and models, while providing valuable insights into the metadata quality of research software to community repositories.

Consortium of Universities for the Advancement of Hydrologic Science, Inc.
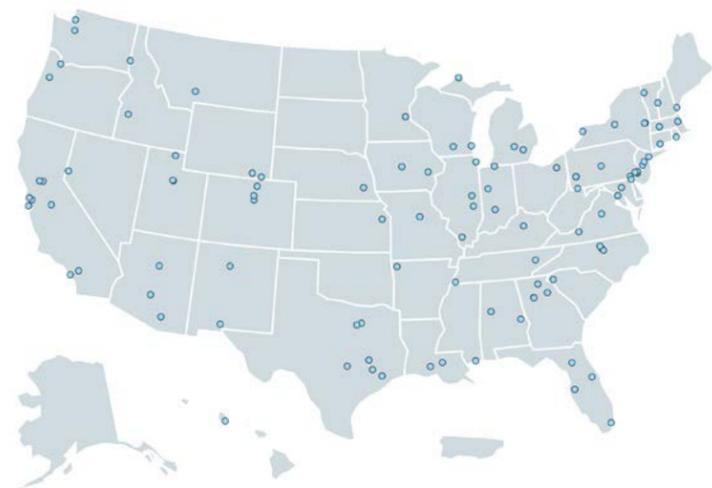
MEMBERSHIP

CUAHSI's membership includes more than 100 U.S. universities, nonprofit affiliates, and international affiliates who recognize the need for interdisciplinary collaboration and innovative thinking to advance water science and solve society's most pressing water issues.

Through CUAHSI membership, your institution can:

- Support the growing national and international water science community;
- Contribute to innovations in water science and education;
- Designate representatives for your organization to participate in community governance; and
- Receive registration discounts on CUAHSI events and workshops. Anyone affiliated with a member organization is eligible for the member discount.

Reach the membership team at membership@cuahsi.org with any questions!

WELCOME TO CUAHSI

A special welcome to new CUAHSI Members of 2025: Rensselaer Polytechnic Institute and American Institute of Hydrology.

Active Members as of December 2025
Arizona State University
Auburn University
Boise State University
Brigham Young University
Carnegie Mellon University
Clemson University
Colorado School of Mines
Colorado State University
Dartmouth College
Drexel University
Duke University
Eastern Illinois University
Florida International University
Georgia Institute of Technology
Georgia State University
Indiana University
Iowa State University
John Hopkins University
Kent State University
Louisiana State University
Marquette University
Michigan State University
Michigan Technological University
Mississippi State University
Montana State University
New Mexico State University
Northeastern University
Northern Arizona University
Northwestern University
Oregon State University
Pennsylvania State University
Portland State University
Prairie View A&M University
Princeton University

Purdue University
Rensselaer Polytechnic Institute
Rutgers University (SUNJ)
Santa Clara University
Smith College
Southern Illinois University
Southern Methodist University
Stanford University
State University of New York-Buffalo
State University of New York-ESF
Stevens Institute of Technology
Syracuse University
Temple University
Texas A&M University
The University of Alabama
University of Arizona
University of Arkansas
University of California-Davis
University of California-Irvine
University of California-Merced
University of California-Riverside
University of California-Santa Cruz
University of Central Florida
University of Colorado-Boulder
University of Delaware
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University of Georgia
University of Hawai'i
University of Houston
University of Idaho
University of Illinois
University of Iowa
University of Kansas
University of Kentucky
University of Louisiana-Lafayette
University of Memphis
University of Michigan
University of Minnesota

University of Missouri
University of Nebraska
University of Nevada-Reno
University of New Hampshire
University of New Mexico
University of North Carolina System
University of North Georgia
University of Notre Dame
University of Pittsburgh
University of Rhode Island
University of South Florida
University of Tennessee-Knoxville
University of Texas-Arlington
University of Texas-Austin
University of Vermont
University of Virginia
University of Washington
University of Wisconsin-Madison
University of Wyoming
Utah State University
Utah Valley University
Villanova University
Virginia Polytechnic Institute and State University
Washington State University
West Virginia University
Yale University

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Suez Canal University
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University of Zurich

Non-Profit Affiliate Members
American Institute of Hydrology
EarthScope
Interstate Council on Water Policy
RTI International
Stroud Water Research Center

CUAHSI FINANCIAL OVERVIEW

2025 was an important year for CUAHSI, with continued core support from NSF (EAR-1849458) and an array of federal subawards. In addition, we secured several new awards, including a new NSF Cooperative Agreement (EAR-2535162) to sustain and evolve core programs and services in 2026-2028, as well as five new awards from CIROH. During the year, CUAHSI made significant progress resolving a backlog of outstanding annual audits, strengthening internal financial and operational procedures, and developing automated dashboarding and reporting to improve transparency and financial oversight.

However, because CUAHSI's funding portfolio is primarily from award-based federal sources, we operate on an expense-reimbursement basis and delays in receiving reimbursements from our funders can still strain our cash flow. To mitigate this risk, we continued to explore ways to diversify our revenue streams. In 2025, we introduced a 'fee-for-service' model for working with CUAHSI as an alternative to traditional collaborative proposal partnerships. Additionally, our Board of Directors Fundraising and Development track will continue to explore donation strategies and strategic partnership opportunities that can help generate critical unrestricted funds that provide stabilization in periods of high demand. These efforts strengthen organizational resilience and long-term sustainability, helping to ensure that CUAHSI can continue to deliver high-quality programs and resources that meet the needs of our water science community.

GOVERNANCE

CUAHSI is governed by a Board of Directors elected by and from member institutions. The Board of Directors includes a diverse group of professionals from various academic institutions who collectively guide CUAHSI's activities and strategic initiatives. The Executive Committee of the board, which includes roles such as the Chair, Immediate Past Chair, Incoming Chair, and two at-large members, is central to the organization's decision-making processes. This structure facilitates effective leadership and strategic management, supporting inclusivity and accountability within the consortium.

2025 CUAHSI Board of Directors

Hoori Ajami, University of California-Riverside
Amy Burgin, Iowa State University
Jon Duncan, Pennsylvania State University
Darren Ficklin, Indiana University
JP Gannon, Virginia Polytechnic Institute and State University
Drew Guswa, Smith College
Paul Hanson, University of Wisconsin-Madison
Anne Jefferson, University of Vermont
Melissa Kenney, University of Minnesota
Safeeq Khan, University of California-Merced
Sarah Ledford, 2025 Chair, Georgia State University
Steven Loheide, University of Wisconsin-Madison
Ashley Matheny, University of Texas-Austin
Diego Riveros-Iregui, University of North Carolina
Jay Zarnetske, Michigan State University

2025 CUAHSI Officers

Jordan Read, President, CUAHSI
Salli Dymond, Secretary, Northern Arizona University
Steve Architzel, Treasurer, University of California-Santa Cruz

CUAHSI Staff CUAHSI staff as of December 31, 2025

CUAHSI was pleased to welcome three new staff members in 2025: Kaysa Varre-Lamoureux as Operations Data Science Fellow, Kimberlee Wong as Environmental Data Science Fellow, and Courtney Di Vittorio as our part-time Visiting Education Scholar.

Jordan Read, Chief Executive Officer
Maureen Ako, Director of Finance
Scott Black, Senior Software Specialist
Abner Bogan, Research Analyst
Anthony Castronova, Lead of Research
Emily Clark, Deputy Director,* Project Manager
Summer Conley, Program and Operations Assistant
Devin Cowan, Research Programmer#
Laura Davis, Accountant
Courtney Di Vittorio, Visiting Education Scholar#
Irene Garousi-Nejad, Research Scientist
Sandesh Maddila, Software Engineer
Julia Masterman, Science Education and Outreach Specialist
Lisa Mucciacito, Community Outreach Specialist
Lindsay Platt, Environmental Data Scientist, Lead of Operations*
Martin Seul, Technical Director
Kaysa Varre-Lamoureux, Operations Data Science Fellow
Kimberlee Wong, Environmental Data Science Fellow

* acting   **#** part-time

CONNECT
WITH CUAHSI

for the latest news and opportunities

✉ Sign up for our mailing list

✳ Join CUAHSI Community Slack Channel

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